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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/595,678	05/04/2006	Kazuki Noda	59018US007	4637

32692 7590 01/20/2011
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EXAMINER	
HENRY, CALEB E	

ART UNIT	PAPER NUMBER
2894	

NOTIFICATION DATE	DELIVERY MODE
01/20/2011	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

LegalUSDocketing@mmm.com
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Office Action Summary	Application No.	Applicant(s)	
	10/595,678	NODA, KAZUKI	
	Examiner	Art Unit	
	CALEB HENRY	2894	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 November 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2 and 4-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2 and 4-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *10/26/2010*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1 and 2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kumamoto (6794751), in view of Yamamoto (6623594).

Regarding claim 1, Kumamoto teaches a semiconductor surface protecting method whereby the circuit side of a semiconductor wafer is protected during the step of back side grinding of the wafer (Kumamoto, col. 1, lines 6-10), comprising in order:

providing a fluid surface protecting layer (Kumamoto, fig. 5a, 500),

coating the fluid surface protecting layer on the circuit side of the semiconductor wafer (Kumamoto, fig. 5a)

placing a polymeric film material (Kumamoto, fig. 6, 510) over the fluid surface protecting layer [**one with common knowledge in the art would know that dicing tape can be composed of polymeric material**], and

grinding said semiconductor wafer (Kumamoto, fig. 7, 350).

Kumamoto does not explicitly teach (**emphasis on bold**):

- the fluid surface protecting layer, **hardened by light or heat**
- **hardening** said fluid surface protecting layer
- grinding said semiconductor wafer is done after hardening said fluid surface protecting layer

Yamamoto teaches a method of using a protective layer, which is patterned on a wafer, during grinding wherein:

- the fluid surface protecting layer, **hardened by light or heat** (Yamamoto, col. 4, lines 43-67)
- **hardening** said fluid surface protecting layer (Yamamoto, col. 8, lines 33-41)
- grinding said semiconductor wafer is done after hardening said fluid surface protecting layer (Yamamoto, col. 8, lines 33-41)

Yamamoto teaches that the hot melt used can be a thermoplastic resin or UV resin and Kumamoto teaches that the protecting layer can be a thermoplastic resin or UV curing resin. Both prior are also related to similar fields of endeavor i.e. layers that protect the wafer during back side grinding. Lastly, Yamamoto teaches that the fluidized hot-melt material can follow up uneven portion of the patterned surface to spread to the entire surface. Therefore, even if the patterned surface has large unevenness, the material can well absorbs step marks to follow up along the surface shape. As a result, any gap is not formed between the semiconductor wafer and the hot-melt sheet, and the sheet does not peel in grinding processing of the wafer, thereby preventing invasion of grinding water or foreign matters, processing errors, dimpling, breakage of the wafer, etc (Yamamoto, col. 4, lines 43-67).

Thus, it would have been obvious to one of ordinary skill in the art at the time said invention was made to append the teachings of Yamamoto to those of Kumamoto due to aforementioned reasons.

Regarding claim 2, Kumamoto/Yamamoto teaches semiconductor surface protecting method according to claim 1, whereby the coating, placing and hardening are carried out in a vacuum ((Kumamoto, col. 5, lines 48-51).

Claims 4-6, 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kumamoto/Yamamoto as applied to claim 1 above, and further in view of Hosomi (5726219).

Regarding claim 4, Kumamoto/Yamamoto, teach a semiconductor surface protecting method whereby the circuit side of a semiconductor wafer is protected during the step of back side grinding of the wafer.

Kumamoto/Yamamoto, does not explicitly teach a surface protecting sheet according to claim 3, wherein, before hardening of the surface protective layer, the protective layer has an elastic shear loss modulus (G") less than its elastic shear storage modulus (G') at room temperature (20-25℃) and an elastic shear loss modulus (G") greater than its elastic shear storage modulus (G') at 30-100℃, as measured with a viscoelesticity measuring apparatus at a frequency of 10 Hz, a deformation of 0.04% and a temperature ramp rate of 3 ℃/rain., and the surface protective layer after hardening has an elastic tensile storage modulus (E') at 50℃ greater than 5 x 107 Pa as measured with a viscoelesticity measuring apparatus at a frequency of 1 Hz, a deformation of 0.04% and a temperature-ramp rate of 5℃/min.

Hosomi teaches a resin which contains the components necessary to form phenol-novolac epoxy (meth)acrylate resin (Hosomi, col. 2, lines 25 -50, (b)). Since

phenol-novolac epoxy (meth)acrylate resin is one of the main materials that can be utilized as the in the surface protecting layer, it must have the characteristics laid out in claim 4.

Hosomi teaches that phenol-novolac epoxy (meth)acrylate resin offers heat resistance at temperatures as high as 260 degrees Celsius. Also, these resins can be used as UV resins, as well as a heat-curing resin, due to the fact that photo-polymerization initiators are added (Hosomi, col. 2, lines 25-50).

Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to append the teachings of Hosomi to the teachings of the Kumamoto/Yamamoto due to aforementioned reasons.

Regarding claim 5, Kumamoto/Yamamoto teach a semiconductor surface protecting method whereby the circuit side of a semiconductor wafer is protected during the step of back side grinding of the wafer.

Kumamoto/Yamamoto does not teach a surface protecting sheet according to claim 3, wherein the surface protecting layer contains at least one type of a free-radical polymerizable compound having two or more ethylenically unsaturated moieties in the molecule, the free-radical polymerizable compound being:
(3) the following resins having a molecular weight of 1000 or greater which are solid at room temperature (20-25℃): phenol-novolac epoxy (meth)acrylate resins.

Hosomi teaches a resin which contains the components necessary to form phenol-novolac epoxy (meth)acrylate resin (Hosomi, col. 2, lines 25 -50, (b)).

Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to append the teachings of Hosomi to the teachings of the Kumamoto/Yamamoto combination because phenol-novolac epoxy (meth)acrylate resin offers heat resistance at temperatures as high as 260 degrees Celsius.

Regarding claim 6, Kumamoto/Yamamoto, teach a semiconductor surface protecting method whereby the circuit side of a semiconductor wafer is protected during the step of back side grinding of the wafer.

Kumamoto/Yamamoto, does not teach the use of a free-radical polymerization initiator.

Hosomi teaches the use of a free-radical polymerization initiator (photopolymerization initiator) (Hosomi, col. 2, lines 55-65, (e)).

Free-radical polymerization initiators are needed in UV curing resin in order to initiate polymerization reaction.

Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to append the teachings of Hosomi to the teachings of the Kumamoto/Yamamoto combination because UV curing resins generally need a free-radical polymerization initiator in order for the UV light to have its intended effect.

Regarding claim 9, Kumamoto/Yamamoto, teach a semiconductor surface protecting method whereby the circuit side of a semiconductor wafer is protected during the step of back side grinding of the wafer.

Kumamoto/Yamamoto, does not teach a surface protecting sheet according to claim 3, wherein the surface protecting layer contains at least one type of a free-radical

polymerizable compound having two or more ethylenically unsaturated moieties in the molecule, the free-radical polymerizable compound being:
(3) the following resins having a molecular weight of 1000 or greater which are solid at room temperature (20-25℃): phenol-novolac epoxy (meth)acrylate resins.

Hosomi teaches a resin which contains the components necessary to form phenol-novolac epoxy (meth)acrylate resin (Hosomi, col. 2, lines 25 -50, (b)).

Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to append the teachings of Hosomi to the teachings of the Kumamoto/Yamamoto combination because phenol-novolac epoxy (meth)acrylate resin offers heat resistance at temperatures as high as 260 degrees Celsius.

Regarding claim 10, Kumamoto/Yamamoto, teach a semiconductor surface protecting method whereby the circuit side of a semiconductor wafer is protected during the step of back side grinding of the wafer.

Kumamoto/Yamamoto, does not teach the use of a free-radical polymerization initiator.

Hosomi teaches the use of a free-radical polymerization initiator (photopolymerization initiator) (Hosomi, col. 2, lines 55-65, (e)).

Free-radical polymerization initiators are needed in UV curing resin in order to initiate polymerization reaction.

Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to append the teachings of Hosomi to the teachings of the

Kumamoto/Yamamoto combination because UV curing resins generally need a free-radical polymerization initiator in order for the UV light to have its intended effect.

Claims 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kumamoto/Yamamoto as applied to claim 1 above, and further in view of Komiyama (5118567).

Regarding claim 7, Kumamoto/Yamamoto, teach a semiconductor surface protecting method whereby the circuit side of a semiconductor wafer is protected during the step of back side grinding of the wafer.

Kumamoto/Yamamoto, does not teach a surface protecting sheet according to claim 3 wherein the surface protecting layer contains at least one cationically polymerizable compound having two or more cationically polymerizable groups in the molecule, the cationically polymerizable compound being:
(2) phenol-novolac epoxy resins of molecular weight 1000 or greater which are solid at room temperature.

Komiyama teaches the use of an adhesive tape which is composed of phenol-novolac epoxy resin (Komiyama, col. 3, lines 57-67). This adhesive tape has adhesive/releasing properties which are well balanced, which initially was a problem in prior art (Komiyama, col. 1, lines 30-36).

Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to append the teachings of Komiyama to the teachings of the

Kumamoto/Yamamoto combination because it offers a balance between adhesive and releasing properties.

Regarding claim 8 Kumamoto/Yamamoto, teach a semiconductor surface protecting method whereby the circuit side of a semiconductor wafer is protected during the step of back side grinding of the wafer.

Kumamoto/Yamamoto, does not teach the use of a free-radical polymerization initiator.

Komiyama teaches the use of a cationic polymerization initiator (photopolymerization initiator) (Komiyama, col. 2, lines 1-12).

Cationic polymerization initiators are needed in UV curing resin in order to initiate polymerization reaction.

Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to append the teachings of Komiyama to the teachings of the Kumamoto/Yamamoto combination because UV curing resins generally need a free-radical polymerization initiator in order for the UV light to have its intended effect.

Claims 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kumamoto/Yamamoto/Hosomi as applied to claim 4 above, and further in view of Komiyama (5118567).

Regarding claim 11 Kumamoto/Yamamoto/Hosomi teach a semiconductor surface protecting method whereby the circuit side of a semiconductor wafer is protected during the step of back side grinding of the wafer.

Kumamoto/Yamamoto/Hosomi do not teach a surface protecting sheet according to claim 3 wherein the surface protecting layer contains at least one cationically polymerizable compound having two or more cationically polymerizable groups in the molecule, the cationically polymerizable compound being:
(2) phenol-novolac epoxy resins of molecular weight 1000 or greater which are solid at room temperature.

Komiyama teaches the use of an adhesive tape which is composed of phenol-novolac epoxy resin (Komiyama, col. 3, lines 57-67). This adhesive tape has adhesive/releasing properties which are well balanced, which initially was a problem in prior art (Komiyama, col. 1, lines 30-36).

Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to append the teachings of Komiyama to the teachings of the Kumamoto/Yamamoto/Hosomi combination because it offers a balance between adhesive and releasing properties.

Regarding claim 12, Kumamoto/Yamamoto/Hosomi teach a semiconductor surface protecting method whereby the circuit side of a semiconductor wafer is protected during the step of back side grinding of the wafer (Oka, col. 2, lines 55-65).

Kumamoto/Yamamoto/Hosomi does not teach the use of a free-radical polymerization initiator.

Komiyama teaches the use of a cationic polymerization initiator (photopolymerization initiator) (Komiyama, col. 2, lines 1-12).

Cationic polymerization initiators are needed in UV curing resin in order to initiate polymerization reaction.

Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to append the teachings of Komiyama to the teachings of the Kumamoto/Yamamoto/Hosomi combination because UV curing resins generally need a free-radical polymerization initiator in order for the UV light to have its intended effect.

Response to Arguments

Applicant's arguments filed 11/16/2010 have been fully considered but they are not persuasive.

Applicant was correct in noting that the rejections for claims 4-6, 9 and 19 7 and 8 were dependent on claim 1 and not claim 3, and examiner apologizes for this.

Concerning claim 1, Applicant asserts that Yamamoto does not teach, "...a fluid protecting layer which can be hardened by light or heat...". Examiner will explain his reasoning.

Claim 1 states, "...can be hardened by heat..." Examiner interpreted this to mean heat is involved, or is the main cause, in the hardening process of the layer. Heat can be used, at least, in the two following ways to harden a layer:

1) the layer is cooler then the chamber (chamber is hot). The layer and chamber can be considered a closed system. Because of aforementioned difference in energy (difference in temperature), the system will tend towards equilibrium; energy will flow from the chamber to the cooler layer in the form of heat transfer.

2) the chamber is cooler then the layer (layer is hot). The layer and chamber can be considered a closed system. Because of aforementioned difference in energy (difference in temperature), the system will tends towards equilibrium; energy will flow from the layer to the cooler chamber in the form of heat transfer.

While the applicant may have meant the first situation, as claim 1 is written, "...can be hardened by heat...", the second situation could also be interpreted from "...can be hardened by heat...". Thus, Yamamoto teaching the layer being cooled to solidify it does read on the limitation "...can be hardened by heat..." as seen in the second situation.

Thus, the rejection stands.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CALEB HENRY whose telephone number is (571)270-5370. The examiner can normally be reached on 9 a.m.-5 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kim Nguyen can be reached on 571-272-2402. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/CALEB HENRY/
Examiner, Art Unit 2894

/Kimberly D Nguyen/
Supervisory Patent Examiner, Art Unit 2894